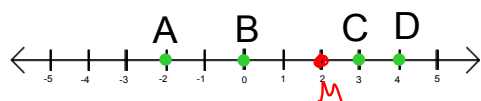


1-3 Distance and Midpoints



$$AD = |4 - (-2)| = 6$$

$$BD = |0 - (-4)| = 4$$

\overline{BD}
midpt

The Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

EX: A(-2, -3) B(2, 4)

$$AB = \sqrt{(-2 - 2)^2 + (-3 - 4)^2}$$

$$16 + 49$$

$$\sqrt{65} \text{ units}$$

EX: C(6, 3) D(0, 0)

$$CD = \sqrt{(6 - 0)^2 + (3 - 0)^2}$$

$$36 + 9$$

$$\sqrt{45}$$

$$CD = 3\sqrt{5} \text{ units}$$

Find MN and OP

Do

1. M(-5, -2) N(1, 4)
2. O(-1, -1) P(20, 6)

Midpoint of a Segment

Midpoint—point halfway between endpoints of a segment

--Average of the coordinates

The Midpoint Formula

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

ex. $A(-4, -2)$
 $B(5, 3)$

$$M\left(\frac{-4+5}{2}, \frac{-2+3}{2}\right)$$

$$M\left(\frac{1}{2}, \frac{1}{2}\right)$$

Find the midpoint

Do

1. $(4, -6)$ $(-3, 2)$
2. $(-4, -3)$ $(8, 5)$

1. $\frac{4+(-3)}{2} = \frac{-6+2}{2}$
 $\left(\frac{1}{2}, -2\right)$

2. $\frac{-4+8}{2} = \frac{-3+5}{2}$
 $(2, 1)$

M is the midpoint of \overline{UD}



$$\overline{UM} \cong \overline{MD}$$

$$UM = MD$$

$$UM = \frac{1}{2}UD$$

Suppose:

$$U(5, 2)$$

$$M(3, -1)$$

$$D(x, y)$$

$$(1, -4)$$

$$\left[\frac{5+x}{2} = 3 \right] \times 2$$

$$5+x = 6$$

$$x = 1$$

$$\frac{2+y}{2} = -1$$

$$2+y = -2$$

$$y = -4$$

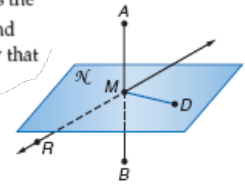
Do

1. U(-5, -3) M(-6, 4) Find D

2. M(-3, 3) D(-14, 12) Find U

Segment Bisector—segment, line, plane that intersects a segment at its midpoint

In the figure at the right, M is the midpoint of \overline{AB} . Plane \mathcal{N} , \overline{MD} , \overline{RM} , and point M are all bisectors of \overline{AB} . We say that they *bisect* \overline{AB} .



HW

p25-26

13-39odd, 43, 45

(not 19,21)